IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	**Dean M. Homan**	§	
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Serial No.:	**10/616,710**	§	**Group Art Unit: 2862**
		§	
Filed:	**July 10, 2003**	§	**Examiner: David M. Schindler**
		§	
Title:	**Electromagnetic Logging Tool Calibration System**	§	**Atty. Docket No.: 19.0317**

Commissioner for Patents
PO BOX 1450
Alexandria, VA 22313-1450

RESPONSE TO THE OFFICE ACTION MAILED MAY 10, 2005

In response to the Office Action mailed May 10, 2005, please amend the above-identified U.S. patent application as follows:

The Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks/Arguments begin on page 8 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for calibrating an electromagnetic logging tool having a plurality of antennas disposed thereon with at least one antenna having its axis at an angle with respect to the axis of the tool, each antenna [[adapted]] being configured to transmit and/or receive electromagnetic energy, comprising the steps of:

(a) disposing a test loop about the electromagnetic logging tool such that the axis of the tool and a plane on which the test loop lies form a tilt angle that is between about 0 and 90 degrees;

(b) measuring a signal induced in one of said antennas when another of said antennas is energized, the induced signal being affected by the test loop; and

(c) determining a correction for the induced signal, including producing a corrected signal and comparing the corrected signal with a calculated signal based on a model including the electromagnetic logging tool and the test loop.

2. (Currently amended) The method of claim 1, wherein step (c) includes applying to the induced signal a correction selected from [[the]] a group consisting of a sonde error correction and temperature correction.

3. (Canceled)

4. (Canceled)

5. (Original) The method of claim 1, further comprising:

altering a position of the test loop about the electromagnetic logging tool and repeating steps (b) to (c).

6. (Original) The method of claim 1, further comprising deriving calibration coefficients for at least one of the antennas.

7. (Original) The method of claim 1, wherein the tilt angle is 45 degrees.

8. (Original) The method of claim 1, wherein at least one of the antennas comprises a plurality of coils having mutually orthogonal axes.

9. (Original) The method of claim 1, wherein at least one of the antennas comprises a plurality of coils having non-parallel axes.

10. (Original) The method of claim 1, wherein the at least one antenna having its axis at an angle comprises a transverse antenna.

11. (Canceled)

12. (Currently amended) The method of claim [[11]] 1, further comprising deriving a gain or phase factor by comparing the corrected signal with the calculated signal.

13. (Currently amended) The method of claim [[11]] 1, further comprising multiplying the corrected signal by gain or phase factors.

14. (Canceled)

15. (Currently amended) The method of claim [[11]] 1, wherein step (c) includes determining a maximum or minimum value associated with the measured signal.

16. (Original) The method of claim 1, wherein step (b) includes rotating the test loop about the axis of the tool.

17. (Original) The method of claim 1, wherein step (b) includes displacing the test loop off the axis of the tool.

18. (Currently amended) A system for calibrating an electromagnetic logging tool, comprising;

a plurality of antennas disposed on the logging tool with at least one antenna having its axis at an angle with respect to the axis of the tool, each antenna [[adapted]] being configured to transmit and/or receive electromagnetic energy;

a test loop [[adapted for disposal]] positionable about the logging tool such that the axis of the tool and a plane on which the test loop lies form a tilt angle that is between about 0 and 90 degrees; and

a processor [[adapted]] configured to calculate a correction for a measured signal induced in one of said antennas by another of said antennas, the induced signal being affected by the test loop, wherein the processor is further configured to calculate said correction using a second measured signal induced at said one antenna without any effect associated with the test loop.

19. (Original) The system of claim 18, wherein the tilt angle is 45 degrees.

20. (Original) The system of claim 18, wherein at least one of the antennas comprises a plurality of coils having mutually orthogonal axes.

21. (Original) The system of claim 18, wherein at least one of the antennas comprises a plurality of coils having non-parallel axes.

22. (Original) The system of claim 18, wherein the at least one antenna having its axis at an angle comprises a transverse antenna.

23. (Original) The system of claim 18, wherein the processor is [[adapted]] configured to apply to the induced signal a correction selected from the group consisting of a sonde error correction and temperature correction.

24. (Canceled)

25. (Currently amended) The system of claim 18 wherein the test loop comprises a conductive loop [[adapted]] having means for selective opening or closing of said loop.

26. (Currently amended) The system of claim 18, wherein the processor is [[adapted]] configured to produce a corrected signal and to compare the corrected signal with a calculated signal.

27. (Currently amended) The system of claim 26, wherein the processor is [[adapted]] configured to derive a gain or phase factor by comparing the corrected signal with the calculated signal.

28. (Currently amended) The system of claim 26, wherein the processor is [[adapted]] configured to multiply the corrected signal by gain or phase factors.

29. (Original) The system of claim 26, wherein the calculated signal is based on a model including the electromagnetic logging tool and the test loop.

30. (Currently amended) The system of claim 18, wherein the processor is [[adapted]] configured to derive calibration coefficients for at least one of the antennas.

31. (Original) The system of claim 18, wherein the calculation for the induced signal correction includes determining a maximum or minimum value associated with the induced signal.

32. (Currently amended) The system of claim 18, wherein the test loop is [[adapted]] positionable for rotation about the axis of the tool.

33. (Currently amended) The system of claim 18, wherein the test loop is [[adapted]] configured for displacement off the axis of the tool.

34. (Currently amended) A system for calibrating an electromagnetic logging tool having a plurality of antennas disposed thereon with at least one antenna having its axis at an angle with respect to the axis of the tool, each antenna [[adapted]] being configured to transmit and/or receive electromagnetic energy, comprising:

a test loop [[adapted for disposal]] positionable about the logging tool such that the axis of the tool and a plane on which the test loop lies form a tilt angle that is between about 0 and 90 degrees;

a computer [[adapted to]] connectible to the electromagnetic logging tool, wherein the computer is [[adapted]] configured to process a program with instructions to perform:

energizing a first antenna on the tool in the presence of the test loop;

measuring an induced signal at a second antenna on the tool; and

determining a correction for the induced signal, wherein determining the correction for the induced signal includes using a signal induced at the second antenna with the conductive loop open.

35. (Original) The system of claim 34, wherein at least one of the antennas comprises a plurality of coils having mutually orthogonal axes.

36. (Original) The system of claim 34, wherein at least one of the antennas comprises a plurality of coils having non-parallel axes.